NEWS AND VIEWS

What is to Happen about Fusion?

THESE are dog days for those who wish to see a rapid development of the kinds of devices which may in due course lead to the development of fusion reactors capable of extracting power from the thermonuclear fusion of light elements. In Britain, the laboratory at Culham will be running on progressively tighter budgets in the five years ahead, for the rate of expenditure is to be reduced at 20 per cent a year for each of the next five years. In the United States there has been a modest increase of expenditure in recent months, but the scale on which large experiments are undertaken in the United States will remain comparatively modest. Gone, for the time being at least, are the days when men working with machines such as that once known as NRX (at Los Alamos) were inclined to think that they would soon be able to accomplish the tricks which had earlier eluded the British machine called ZETA. Instead, everybody is taking a sober view of the problems that will have to be solved before thermonuclear power can become a reality. Plasma physics is the watchword, not fusion research. So long as this is properly appreciated, however, it is valuable to be reminded, now and again, of the potential benefits there would be if fusion reactors ever became a practical proposition.

At least the uncertainty over the scale of support for fusion does not seem to have demolished the confidence of its supporters. Workers at Culham and elsewhere are going ahead with research and even with engineering designs for full scale power reactors. Last month, Mr R. Carruthers from Culham described just such a study for a 2,100 MW (e) fusion power station which would, he said, cost substantially less than the advanced gas cooled reactors being built at Dungeness, and which would generate electricity 10 per cent more cheaply than a fast breeder reactor. Fuel costs would be negligible and there would be no problem of disposal of radioactive waste.

Although some may feel that it is optimistic indeed to design a reactor before the fundamental problems of plasma containment have been solved, there had until last week been little argument about the question of waste. On more than one occasion, indeed, supporters of fusion as a source of power have compared the messy results of fission reactors with the clean, waste-free designs for fusion reactors. The announcement last week by the European Nuclear Energy Agency that it has started to dump radioactive waste in the eastern Atlantic as a collaborative project involving five European countries brought home just how large the problems of disposal will have become by the end of the century. But now, in a paper in *Science* (**159**, 83: 1968) Dr Frank L. Parker of the Health Physics Division at the Oak Ridge National Laboratory in the United States has suggested that fusion reactors would indeed be a source of harmful waste, in the form of tritium lost by the reactor vessel. Dr Parker considers a reactor in which deuterium reacts with tritium —the same design as that described by Mr Carruthers —and quotes results obtained by Professor D. J. Rose at Massachusetts Institute of Technology. These figures, he says, show that for every tritium atom burned 1·15 atoms have to be produced. This means that 15 per cent of the tritium produced is lost, and this would be equivalent to $1{\cdot}1 \times 10^6$ curies of radioactivity a day for a 1,000 MW (e) station.

This calculation seems a little wild, and Mr Carruthers is undeterred by it. The fact that tritium is lost does not mean that it is all lost to the atmosphere. On the contrary, in a working reactor, most of the tritium would be recirculated. Some would be absorbed into the material of the reactor and a small but not negligible amount would be lost by decay. Although it would be important to ensure that tritium leakage was minimized, he says, the problem would not be as great as Dr Parker feared.

An Account of Geckos

GEKKONID lizards are perhaps best known for their vocalization and for their ability to climb smooth vertical surfaces by means of dilated areas—suction pads—on the ends of their digits. There is, however, much more to their biology than this. It is perhaps not so well known that a few forms have extensive skin folds on their bodies and tails which, when extended, enable the animal to glide from tree to tree. Some species are even known to excavate their own tunnels. The family indeed shows a wide range of structural and biological diversity, and it has adapted to most environmental extremes. An authoritative account of the biology of the family has been written by A. G. Kluge (*Bull. Amer. Mus. Nat. Hist.*, **135**, 1–60; 1967). In this paper, Dr Kluge also discusses the taxonomy and evolution of gekkonid lizards, and he proposes a new sub-familial classification which differs in some features from that suggested earlier by Underwood. In a more recent publication, with more specific appeal, Kluge now deals with the systematics, phylogeny and zoogeography of the genus *Diplodactylus* Gray (*Aust. J. Zool.*, **15**, 1007–1108: 1967).

The Gekkonidae are found on all the main land masses between the latitudes 50° N. and 50° S. The genera number 82, and some 650 species have been identified. Adults vary in total length from less than 40 mm to more than 350 mm. The digits are long and slender, angulate or straight to very dilated. Some species have webbed hands and feet, and there are